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This document presents checklists for the minimum requirements for study plans prepared for Region VIII projects. Well-written study plans are required as supporting documentation for activities that might be challenged in court. The intent of the quality assurance office review is to help produce a study plan that uses technically-sound, EPA-approved procedures employing sufficient quality control measures that result in enforcement quality data and documents.

The use of references to EPA approved methods, analytical methods, standard operating procedures, field operating procedures, etc. is strongly encouraged. This will reduce writing time, document size, and quality assurance office review time. Work is under way to assemble and catalog Region VIII EPA approved methods, standard operating procedures, field operating prodedures, etc. that will be made available in hard-copy and on word processor floppy discs to study plan writers.

The use of tables is also strongly encouraged. Tables should be used to summarize the number of samples to be collected by matrix type and the parameters to be analyzed for each sample. Appropriate headings for such a table include matrix, number of samples, parameters (to be analyzed by sample matrix type), sample container, preservatives, and holding times.

Another table should be used to summarize some of the data quality criteria, including some of the data quality objectives (precision, accuracy, comparability, representativeness, and completeness). Appropriate headings include parameter, analytical method number, detection limit (required for the study), precision limits (required for the study), accuracy limits (required for the study for spikes and reference materials), completeness, action limits, surrogate recovery limits (for appropriate surrogate), lab holding times (for samples and extracts) and percent relative deviation (for duplicates).

Regional documents provide guidelines for the preparation of quality assurance program plans (QAPPs) and quality assurance project plans (QAPjPs). A copy of a checklist for QAPjPs is included as Attachment 1. The following list of items should be used as a checklist for the preparation of other study plans. Not all of the items need to be addressed in every study plan. Most of the items on the checklist should be addressed either in a QAPP, QAPjP, in the study plan of interest or in some other study plan for this site that can be referenced.

- Introduction (where is the site, who caused the alleged problem, why is it a problem, and when did it occur).
- Objectives of the study (how will each and every task be performed). Quality control criteria should be discussed here

for every task to be performed and every measurement made. The tables mentioned above should be inserted here.

- o Project organization and responsibility (a block diagram can be inserted here showing positions and names of individuals working on this project).
- o Sampling procedures:
  - a. Description of process of selecting appropriate sampling locations, depths, etc.
  - b. Will a statistically sufficient number of sites be sampled?
  - c. Will all necessary ancillary data be measured with appropriate quality control?
  - d. Will climatic flow or other conditions under which sampling conducted be considered?
  - e. Has consideration been given to which media are to be sampled (e.g., wastewater, sediment, effluent, soil)?
  - f. Were appropriate sample containers selected?
  - g. Were the frequency of sampling and the length of sampling period considered?
  - h. Were the appropriate types of samples (e.g., composites or grabs for inorganics only) considered?
  - i. Is chain-of-custody addressed?
    1. Field sampling documentation:
       - a. Preparation procedures.
       - b. Sample acquisition.
       - c. Sample preservation.
       - d. Labels.
       - e. Sealing each sample bottle in individual plastic bag with seals around bottle lid and plastic bag.
       - f. Sample bottle label (each bottle marked with grease pencil, protected with clear plastic tape if necessary).
       - g. Shipping container seal (lid should be sealed with box-car seal and hinges made tamper-proof).
       - h. Custody sheet.
    2. Laboratory Operations:
       - a. Identification of sample custodian.
       - b. Sample custody log.
  - j. Is sampling equipment and container preparation considered?
  - k. Are sampling preservation methods and holding times included?
  - l. Is record keeping adequately addressed?
- o Calibration procedures and frequency.
- o Analytical procedures (should be addressed in table by number or else the method must be attached).
- o Data reduction and validation:
  - a. Data reduction scheme.
  - b. Equations to calculate concentrations.
  - c. Data validation criteria (in addition to table information above).
  - d. Identification and treatment of outliers.

e. Data flow on reporting scheme.

- Field quality control check samples (1/set, 1/day or 1/20, per medium, whichever is greater).
  a. Rinsate blanks (laboratory pure water used to rinse field equipment washed between samplings.
  b. Trip blanks for volatile organics (laboratory pure water placed in septum capped volatiles vials in the lab that accompany sample vials entire route to field and back to lab.
  c. Field spikes.
  d. Replicates.
  e. Reference samples submitted as blinds.
- Laboratory quality control samples (1/set, 1/day or 1/20, per medium, whichever is greater):
  a. Spikes.
  b. Replicates.
  c. Reference samples.
  d. Reagent blanks.
- Field audit schedules.
- Laboratory audit schedules.
- Preventative maintenance for lab and field equipment:
  a. Schedules.
  b. Procedures.
  c. Critical components.
- Risk assessment
- Assessment criteria and procedures for data acceptability.
- Corrective action:
  a. Limits.
  b. Procedures.
  c. Identification of responsible personnel.
- Quality assurance reports to management on field and lab operations.